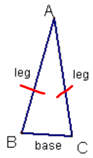
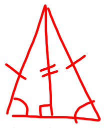
4.7 Use Isosceles and Equilateral Triangles

ΔABC is isosceles

$\overline{AB} \cong \overline{AC}$



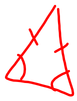
$\angle A$ is the vertex angle
$\angle B$ and $\angle C$ are the base angles

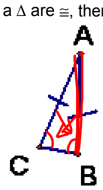


B.A.T.

Base Angles Theorem-(Theorem 4.7) If 2 sides of a Δ are $\cong$, then the angles opposite those sides are $\cong$.

Since $\overline{AB} \cong \overline{AC}$, then $\angle C \cong \angle B$

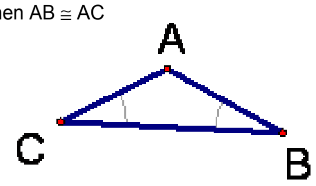




The Converse of the Base Angles Theorem-(Theorem 4.8) If 2 angles of a Δ are $\cong$, then the sides opposite those angles are $\cong$.

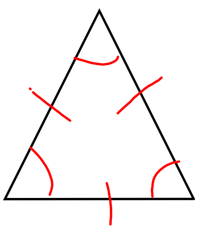
Conv. BAT.

Since $\angle C \cong \angle B$, then $\overline{AB} \cong \overline{AC}$



Corollary -If a Δ is equilateral, then it is equiangular

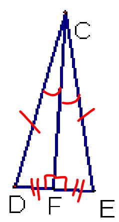
Corollary -If a Δ is equiangular, then it is equilateral



*******The altitude of an isosceles Δ is $\perp$ to the base at its midpoint.**

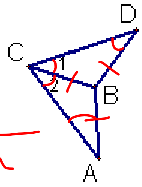
If $\overline{CF}$ is the altitude from the vertex angle, then DF = FE and $m\angle CFE = 90°$

Why? $\Delta DFC \cong \Delta EFC$ by HL



Proof Examples:

Given: AB = CB = BD
$\angle 2 \cong \angle 1$
Prove: $\angle A \cong \angle D$

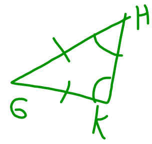


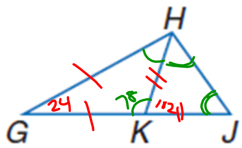
① ~~~	① Given
② $\angle 2 \cong \angle A$, $\angle 1 \cong \angle D$	② B.A.T
③ $m\angle 2 = m\angle A$, $m\angle 1 = m\angle D$	③ def of $\cong$
④ $m\angle A = m\angle D$	④ Subs
⑤ $\angle A \cong \angle D$	⑤ def of $\cong$

In the figure, $\overline{GK} \cong \overline{GH}$ and $\overline{HK} \cong \overline{KJ}$.

$m\angle G = 24$

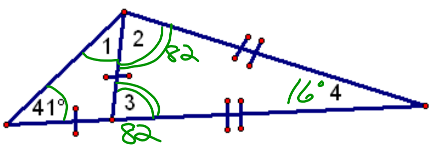
$m\angle J =$ 39°





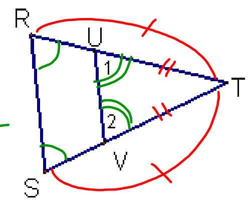
180
−24
156 ÷ 2 = 78 ÷ 2

Find the measures of the numbered angles.



$m\angle 1 = 41$

Given: $\angle R \cong \angle S$
$\angle 2 \cong \angle 1$
Prove: $\overline{RU} \cong \overline{SV}$



S.	R.
① ~~~	
② $\overline{ST} \cong \overline{RT}$, $\overline{VT} \cong \overline{UT}$	② Conv. BAT
③ ST = RT, VT = UT	③ def of $\cong$
④ RT = RU + UT, ST = SV + VT	④ SAP
⑤ RU + UT = SV + VT	⑤ Subst
⑥ RU = SV	⑥ Subtr.
⑦ $\overline{RU} \cong \overline{SV}$	⑦ def of $\cong$

HW
p267-268 #s 11-13, 15-17,
20-22, 32, 33